

ATF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

AMITABH JAIN ET AL.

Serial No. 10/816,776 (TI-349137)

Filed April 2, 2004

For: ULTRA SHALLOW JUNCTION FORMATION

Art Unit 2813

Examiner David S. Blum

Customer No. 23494

Mail Stop Appeal Brief-Patents  
Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

**CERTIFICATE OF MAILING OR TRANSMISSION UNDER 37 CFR 1.8**

I hereby certify that the attached document is being deposited with the United States Postal Service with sufficient postage for First Class Mail in an envelope addressed to Director of the United States Patent and Trademark Office, P.O. Box 1450,, Alexandria, VA 22313-1450 or is being facsimile transmitted on the date indicated below:

5-19-06

Jav M. Cantor, Reg. No. 19,906

Sir:

**REPLY BRIEF**

In reply to the Examiner's Answer, it is initially noted that the invention relates to a method for forming ultra shallow junctions in a semiconductor substrate. This is not the purpose of Mayur and it therefore follows that, for this reason alone, any attempt to stretch the ranges of Mayur to equate them to those claimed is improper and merely a result of an initial reading of the subject disclosure. A reading of Mayur alone would not teach or suggest the stretching of the ranges disclosed in Mayur to extend to the ranges claimed herein.

It is again noted that claim 1 requires, among other features, the step of annealing the implanted semiconductor with a ultra high temperature anneal comprising annealing

34193AA-1

temperatures from 1050°C to 1350°C. for from about 0.5 to about 3 milliseconds. Mayur teaches an implant anneal at a temperature of greater than 1300K which as about 1026C for a duration of less than 50 milliseconds (paragraph 0007). Mayur further states at paragraph [0173] that “the optimum...pulse length [is] (5 nS-20 nS)...” for a specific laser. At paragraph [0129] the maximum pulse length is stated to be near 50 nanoseconds, meaning that this time length is less than 50 nanoseconds since all other times provided are less than 50 nanoseconds. At paragraph [0026] it is specifically stated that “[u]sing the techniques of the instant invention, it has been unexpectedly discovered that, in the case of shallow drain extension annealing in silicon integrated circuit manufacturing, the alexandrite laser, having a pulse length of 5 nS-20 nS...is suitable”. It follows that Mayur consistently teaches an annealing step of less than 50 nanoseconds. There is no reason whatsoever to extend this range to that claimed herein, especially when the purpose of the combination of annealing time and temperature as claimed is for a purpose not contemplated by Mayur.

As noted in the Summary of Claimed Subject Matter, the intent of the subject invention is to create an ultra shallow junction in a semiconductor device. This is accomplished by an anneal process using a combination of very high temperature and very short duration. The claimed ultra high temperature range of the anneal is higher than any temperature suggested by Mayur and the duration of the anneal at the ultra high temperature is substantially less than suggested by Mayur (less than 50 milliseconds as opposed to 0.5 to 3 milliseconds). It is this combination which provides for the ultra shallow junction which cannot be obtained by any combination of temperature and anneal time suggested by Mayur. The differences over Mayur, especially in the anneal time, are so vast as to be beyond any reasonable suggestion that the differences are to be expected. Clearly, when the purpose of the invention is not contemplated by Mayur and the

conditions are vastly different from those suggested by Mayur, non-obviousness is readily apparent.

The Examiner's Answer states that Table II of Mayur sets forth a melting temperature of 1423K (1150 C). However, nowhere does Mayur allege that annealing takes place at this temperature or any temperature other than greater than 1300K and not for the purpose or time length required by the present invention. It follows that, with Mayur in his possession and without the benefit of the subject disclosure, a person with ordinary skill in the art would not be led to provide an ultra shallow junction in accordance with the dictates of claim 1 herein.

The above argument applies as well to independent claims 5, 9 and 13.

### **CONCLUSIONS**

For the reasons stated above, reversal of the final rejection and allowance of the claims on appeal is requested that justice be done in the premises.

Respectfully submitted,



Jay M. Cantor  
Reg. No. 19906  
(301) 424-0355  
(972) 917-5293